

Chronic Septic Arthritis of a Native Elbow Caused by *Cutibacterium acnes*: A Case Report

CASE REPORT

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Introduction: *Cutibacterium acnes* is a slow-growing, aerotolerant anaerobic, gram-positive organism most often discussed in shoulder surgery and implant-associated infection. Native elbow septic arthritis due to *C. acnes* is rare and can be missed when cultures are not held long enough.

Case Presentation: An 18-year-old right-hand dominant male landscaper presented with six weeks of atraumatic left elbow pain, swelling, stiffness, and night sweats after failing a one-week course of oral sulfamethoxazole/trimethoprim and cephalexin. White blood cell count was normal at 9,000/microliter, whereas ESR was 59 mm/hr and CRP was 8.9 mg/dL. Radiographs showed elbow effusion without osseous abnormality, and MRI demonstrated a complex loculated effusion with surrounding soft tissue inflammation. Initial arthrocentesis was nondiagnostic because less than 2 mL of bloody fluid was obtained, leaving insufficient fluid for analysis or culture. Because symptoms persisted despite empiric inpatient intravenous antibiotics, the patient underwent open irrigation and debridement through a posterior triceps-split approach. Purulent material was encountered, multiple intraoperative specimens were deliberately sent for prolonged incubation, and at least two separate intraoperative cultures grew *C. acnes* on postoperative days 9 and 11. Formal antimicrobial susceptibility results were not available in the source record. The patient was discharged on oral ciprofloxacin and linezolid for two weeks until outpatient follow-up under the treating clinical team. At two-week follow-up, he had no early wound complication and range of motion improved to 5 to 120 degrees.

Discussion: This case illustrates an indolent native-joint infection with normal peripheral leukocyte count, elevated inflammatory markers, initially nondiagnostic aspiration, and delayed culture positivity after extended incubation. Antibiotic exposure before operative sampling and the absence of susceptibility data limit interpretation.

Conclusion: *C. acnes* should be considered in chronic atraumatic monoarthritis of the elbow. Multiple operative specimens and prolonged culture incubation are important when routine evaluation is nondiagnostic.

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INTRODUCTION

Cutibacterium acnes, formerly Propionibacterium acnes, is a slow-growing, aerotolerant anaerobic, gram-positive organism that commonly resides in skin flora. It is well recognized in orthopedic infection, especially shoulder surgery and implant-associated infection, where biofilm formation, low virulence, and delayed culture growth can complicate diagnosis.¹⁻⁶

Reports involving native, non-shoulder, and non-prosthetic sites are less common, but they are clinically important because the presentation may be subtle and the organism may be dismissed as a contaminant. Prior non-shoulder reports and broader reviews of anaerobic bone and joint infection support considering *C. acnes* beyond the shoulder when clinical findings are consistent with indolent infection.¹⁻⁶

This case report describes chronic native septic arthritis of the elbow caused by *C. acnes* in an otherwise healthy young adult. The case is instructive because it combines a normal peripheral white blood cell count, elevated inflammatory markers, nondiagnostic aspiration, empiric antibiotics before operative cultures, and delayed culture positivity after prolonged incubation.¹⁻⁶

CASE PRESENTATION

Patient Information

An 18-year-old right-hand dominant male landscaper with no significant past medical history and a body mass index of 19.8 kg/m² presented with a six-week history of atraumatic left elbow pain and swelling. The pain was constant, worsened with movement, and was associated with stiffness and night sweats. He denied recent trauma, insect bite, scratch, or penetrating injury. One month before admission, he had completed a one-week course of sulfamethoxazole/trimethoprim and cephalexin, but his symptoms persisted.

Clinical Findings

On examination, the left elbow was swollen, warm, and erythematous, with intact skin and painful limited motion from 10 to 90 degrees of flexion. The extremity was neurovascularly intact. The patient also had axillary lymphadenopathy on ultrasound without thrombosis.

The clinical course is summarized in the clinical timeline (Table 1).

Table 1.

Time point	Clinical event
Six weeks before admission	Atraumatic left elbow pain and swelling began, later associated with stiffness and night sweats.
One month before admission	Completed one week of oral sulfamethoxazole/trimethoprim and cephalexin without symptom resolution.
Admission	Laboratory testing showed normal WBC count of 9,000/microliter with elevated ESR of 59 mm/hr and CRP of 8.9 mg/dL. Radiographs demonstrated effusion without fracture, erosions, or periosteal reaction (Figures 1 and 2). Ultrasound showed axillary lymphadenopathy without thrombosis.
Early hospital course	Elbow arthrocentesis yielded less than 2 mL of bloody fluid, insufficient for synovial analysis or culture; the aspiration was therefore nondiagnostic rather than culture-negative.
Hospital day 7	MRI with contrast demonstrated a complex loculated effusion, synovial inflammatory change, and surrounding soft tissue inflammation, most pronounced near the flexor-pronator origin (Figures 3-5).
Operative treatment	Persistent symptoms and MRI findings prompted open irrigation and debridement through a posterior triceps-split approach. Purulent material was encountered, and multiple intraoperative specimens were intentionally sent for pathology and prolonged culture incubation.
Postoperative days 9 and 11	At least two separate intraoperative cultures grew <i>C. acnes</i> after prolonged incubation. Formal susceptibility results were not available in the source record.
Discharge to follow-up	The patient was discharged on oral ciprofloxacin and linezolid for two weeks until outpatient follow-up under the treating clinical team. Exact inpatient intravenous agents, doses, and total planned antibiotic duration were not available in the source record.
Two-week follow-up	The wound was healed, no early wound complication was noted, the patient reported no residual elbow pain, and elbow range of motion improved to 5 to 120 degrees.

Diagnostic Assessment

Laboratory testing showed a normal peripheral white blood cell count of 9,000/microliter with elevated inflammatory markers, including an erythrocyte sedimentation rate of 59 mm/hr and C-reactive protein of 8.9 mg/dL. Plain radiographs demonstrated elbow effusion with preserved joint spaces and no osseous abnormality, fracture, periosteal reaction, or bony erosion (Figure 1 and Figure 2). Ultra-

sound demonstrated axillary lymphadenopathy without thrombosis.

Initial elbow arthrocentesis through the posterolateral soft spot yielded less than 2 mL of bloody fluid, which was insufficient for synovial cell count, Gram stain, crystal analysis, or culture. This initial evaluation was therefore nondiagnostic because of insufficient aspirate volume, not truly culture-negative.

MRI with contrast on hospital day 7 showed a complex, loculated joint effusion, synovial inflammatory change, soft tissue edema, and capsular distention, with inflammation most pronounced near the flexor-pronator origin (Figure 3, Figure 4 and Figure 5).

Given the atraumatic monoarthritis, night sweats, normal white blood cell count, elevated ESR and CRP, and axillary lymphadenopathy, the differential diagnosis included typical bacterial septic arthritis, indolent infection including mycobacterial infection, disseminated gonococcal infection, Lyme arthritis, inflammatory arthropathy, and crystalline arthropathy. The absence of adequate aspirate limited early synovial analysis. Operative findings of purulence, pathology showing fibrinopurulent inflammation, and delayed growth of *C. acnes* from at least two separate intraoperative cultures supported septic arthritis due to *C. acnes* rather than a purely inflammatory or crystalline process.



Figure 1. Anteroposterior radiograph of the left elbow demonstrating a joint effusion with preserved joint spaces and no osseous abnormalities, fracture, or periosteal reaction.



Figure 2. Lateral radiograph of the left elbow demonstrating posterior joint effusion, evidenced by displacement of the anterior and posterior fat pads, without associated fracture or bony erosion.

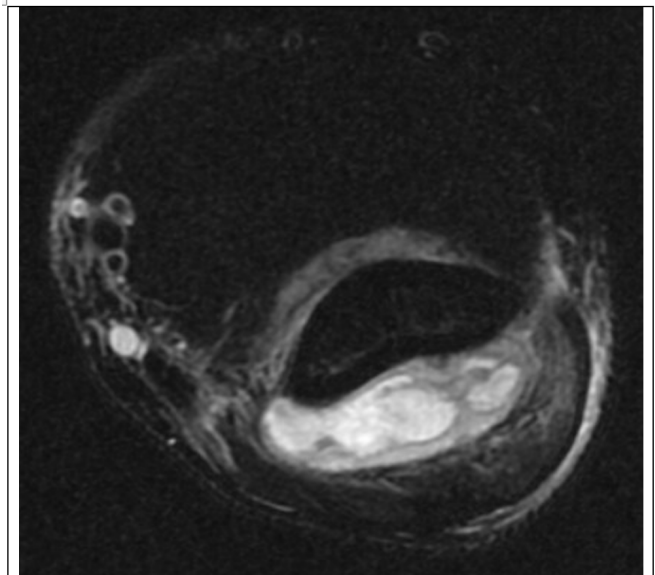


Figure 3. Axial T2-weighted fat-suppressed magnetic resonance image of the left elbow showing a multiloculated joint effusion with synovial thickening and surrounding soft tissue edema, most pronounced near the flexor-pronator origin, consistent with septic arthritis.

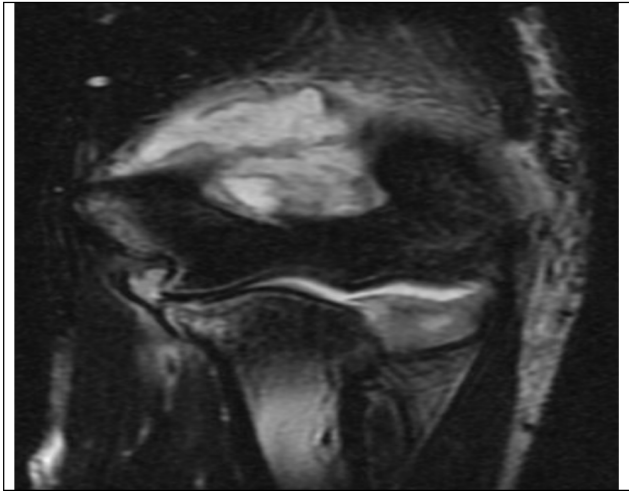


Figure 4. Coronal T2-weighted magnetic resonance image demonstrating a large joint effusion with heterogeneous internal signal and synovial inflammatory change, compatible with septic arthritis.

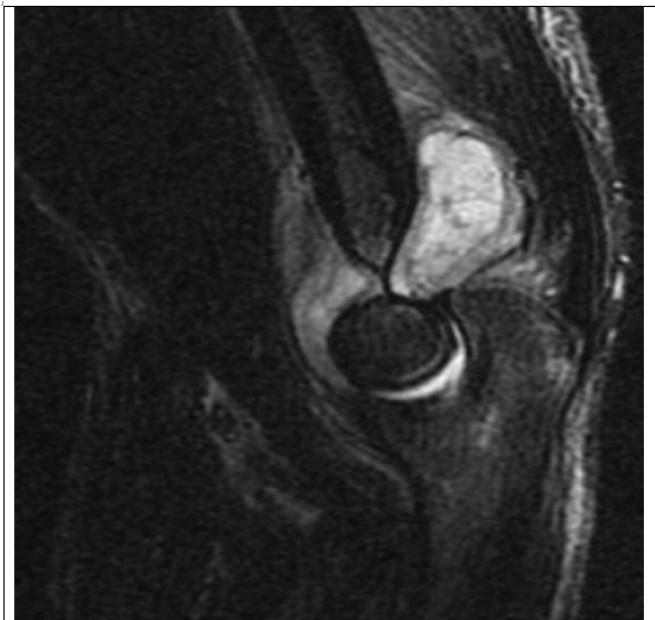


Figure 5. Sagittal T2-weighted magnetic resonance image demonstrating complex joint fluid within the olecranon and coronoid fossae, with surrounding soft tissue inflammation and joint capsule distention.

Therapeutic Intervention

Empiric intravenous antibiotics were administered during the admission before operative sampling. This sequence is now explicitly reported because antibiotic exposure before definitive operative cultures may reduce the sensitivity of early microbiologic testing.

Because symptoms persisted and MRI showed a complex loculated effusion, the patient underwent open irrigation and debridement using a posterior elbow incision and tri-

ceps-split approach. Purulent material was encountered within the joint. Extensive irrigation and debridement were performed, and multiple intraoperative specimens were deliberately sent for both pathology and prolonged aerobic and anaerobic culture incubation as a diagnostic strategy for slow-growing organisms.

Pathologic analysis demonstrated inflamed granulation tissue and fibrinopurulent exudate without malignancy. At least two separate intraoperative cultures grew *C. acnes* on postoperative days 9 and 11 after extended incubation. Formal antimicrobial susceptibility results were not available in the source record. The exact number of total intraoperative specimens submitted, the exact inpatient intravenous antibiotic agents and doses, and the total planned duration of antibiotics were also not available in the source record. The patient was discharged on oral ciprofloxacin and linezolid for two weeks until outpatient follow-up under the treating clinical team. This regimen is acknowledged as atypical for *C. acnes*, which is often susceptible to penicillin-class agents and ceftriaxone; in this case, the rationale documented from the available record was broad oral coverage pending follow-up in the setting of delayed organism identification and absent susceptibility data.

Follow-up and Outcomes

At two-week follow-up, the patient had no residual elbow pain, the surgical wound had healed, and there were no early wound complications. Elbow range of motion improved from 10 to 90 degrees preoperatively to 5 to 120 degrees at the two-week follow-up visit. Because the available follow-up was short, the outcome is reported as an early clinical improvement rather than a durable cure.

PATIENT CONSENT AND ETHICS STATEMENT

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the consent form is available on request.

Institutional Review Board approval was not required for this single-patient, de-identified case report per institutional policy. Written informed consent was obtained from the patient as described above.

DISCUSSION

C. acnes is a recognized cause of indolent orthopedic infection, particularly in the shoulder and in implant-associated settings, but native elbow septic arthritis caused by this organism is rare. The rarity of the site creates two practical problems: clinicians may not initially prioritize *C. acnes* in the differential, and a delayed positive culture may be interpreted as contamination rather than true infection.^{1-6,9}

Several features support *C. acnes* as the true pathogen in this case. The patient had persistent monoarticular symptoms, MRI evidence of a complex effusion with synovial inflammation, intraoperative purulence, pathology showing fibrinopurulent exudate, and delayed growth of *C. acnes* from at least two separate operative cultures. This combination makes the organism more clinically meaningful than a single unexpected positive culture in an otherwise uninfected operative field.^{1,2,5,7-10}

The normal white blood cell count with clearly elevated ESR and CRP is also important. Rather than arguing against infection, this dissociation fits the low-virulence and indolent pattern described for *C. acnes* and helps explain why the diagnosis may be delayed when clinicians rely heavily on leukocytosis.^{3-6,11,12}

The case also illustrates the importance of culture strategy. *C. acnes* may require 10 to 14 days of incubation, and standard shorter culture protocols can miss the diagnosis. Sending multiple operative specimens for prolonged incubation was a deliberate diagnostic strategy in this case, not merely a routine step. This approach is especially important when aspiration is nondiagnostic, inflammatory markers are elevated, and imaging suggests septic arthritis.^{1,2,5,7-10}

The differential diagnosis was broad because the patient had atraumatic monoarthritis, night sweats, normal leukocyte count, and axillary lymphadenopathy. Typical bacterial septic arthritis remained a concern because of the painful swollen joint and elevated inflammatory markers. Indolent infection, including mycobacterial infection, was considered because of the chronic course and night sweats. Disseminated gonococcal infection was relevant because of age and sexual activity, although the operative findings and delayed *C. acnes* growth ultimately supported *C. acnes*. Lyme arthritis, inflammatory arthropathy, and crystalline arthropathy were also considered, but the available record did not identify a synovial fluid profile because the aspiration was insufficient.^{3,12}

Antibiotic selection deserves comment because ciprofloxacin and linezolid is not the classic expected regimen for *C. acnes*, which is often susceptible to beta-lactam therapy. In the available source record, formal susceptibility data were not available, and the oral regimen was selected by the treating clinical team as broad oral coverage pending outpatient follow-up. Because many published discussions of *C. acnes* bone and joint infection describe treatment durations of weeks to months, the shorter two-week oral course documented here should be interpreted cautiously and not

as evidence of an optimal regimen. The report therefore emphasizes diagnosis, culture strategy, and early clinical response rather than making a treatment-duration recommendation.³⁻⁶

This report has limitations. It describes a single patient, so it cannot define incidence, optimal antibiotic selection, or long-term outcomes. The exact number of total intraoperative specimens submitted, susceptibility results, inpatient intravenous antibiotic agents and doses, and total planned antibiotic duration were not available in the source record. Empiric antibiotics were also administered before operative culture sampling, which may have reduced early microbiologic yield. Finally, follow-up was limited to two weeks, so only early clinical improvement can be reported.

CONCLUSION

C. acnes should be considered in chronic atraumatic monoarthritis of the elbow when the clinical course is indolent, the white blood cell count is normal, inflammatory markers are elevated, and initial aspiration is nondiagnostic.

For suspected indolent septic arthritis, multiple intraoperative specimens and prolonged culture incubation are important diagnostic steps that can prevent missed or delayed identification of slow-growing organisms.

CONFLICT OF INTEREST DISCLOSURE

The authors have no relevant financial or nonfinancial conflicts of interest to disclose in relation to this case report.

DECLARATIONS

Funding: No funding was received for this case report.

Conflicts of Interest: The authors have no relevant financial or nonfinancial conflicts of interest to disclose in relation to this case report.

Patient Consent: Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the consent form is available on request.

IRB / Ethics Approval: Institutional Review Board approval was not required for this report per institutional policy.

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Author Contributions (CRediT): P.E.G. — Conception and design, manuscript writing, manuscript editing

Use of Generative AI: AI was used in language editing and formatting of manuscript.

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